Real-time Cave Destruction Using 3D Voronoi

Simulation and source code: https://bitbucket.org/Marko_T/real-timecavedestructionusing3dvoronoi/src/master/

General Idea
User starts inside an initial cave room. User can then mine in any direction they want. With each “hit” a rock is removed from the cave revealing more rocks behind it. Cave area is dynamically expanded as the user keeps on mining and rocks are dynamically created at the runtime.

Generating the Cave
Initial cave is generated using Bowyer-Watson algorithm to get a Delaunay triangulation and then from the triangulation the Voronoi diagram is found.

Mining the Cave
To do any mining in the cave, the user is given a mining laser.

Performance
To speed up the insertion of new points and the initial generation multiple optimizations were implemented for the Bowyer-Watson algorithm:
1. Improved face validity check
2. Improved bad-tetrahedron localization
3. Improved first bad-tetrahedron search